

Aethon Adds RFID to Robotic Hospital Helpers

Designed to roam a facility and locate tagged assets, the Homer can also be used to retrieve and deliver them.

By Mary Catherine O'Connor

May 22, 2007—A Tug is a hospital robot created by [Aethon](#), a Pittsburgh firm comprised of technology and software experts with deep experience working in the health-care field. The company developed the Tug to perform such mundane but vital tasks as retrieving and delivering drugs or test specimens. Hospital staff are often too busy to perform such tasks without taking time away from patient care.

Now, six of the more than 34 hospitals already using Tugs—including [The Johns Hopkins University](#) and the [University of Maryland Medical Center](#) in Baltimore, as well as [Providence Hospital](#) in Washington, D.C.—are testing an RFID-enabled version of the robot, dubbed Homer. This model performs the same jobs as a Tug, but also carries an RFID interrogator used to locate RFID-tagged assets as it moves around a hospital.

"Other companies have RFID solutions that will find assets," says Peter Seiff, Aethon's vice president of consumer relations. "But once you do that, you still need someone to go get the asset and deliver it. So we figure, why not use [our system] for both tasks? The real beauty of what we do is not just track assets, but also recover them." To enable this, Homer has a container in which assets can be placed for delivery.

According to Seiff, Aethon's platform can be a more cost-efficient asset-tracking solution than others on the market. Rather than installing an infrastructure of fixed-position RFID readers, he says, hospitals can purchase a number of Homer units designed for asset-tracking and retrieving applications, and install a reader on each Tug they already use. Hospitals can dispatch Homers to inventory tagged assets in a given area at set times each day—particularly late at night, when most tagged equipment is stored. By mounting a reader and antenna on a Tug already being used as a courier for drugs or test specimens, hospitals can perform ad hoc searches for tagged assets as the Tug makes its rounds throughout the day, by collecting tag IDs and location data of any tags it happens to pass.

The robot—either Tug or Homer—finds its way around a hospital through the use of a facility map saved to its memory. Each model can operate for up to eight hours on a battery pack, and each must be docked on a recharger at night. Once docked, the robot recognizes its location because the dock is programmed into its memory as a home base. When called into duty, the robot receives instructions telling it where to go in the hospital. It then leaves the dock and heads for a patient's room or some other designated site, which it locates on its internal map.

All the while, the machine logs the direction and distance it travels. It can also discern which floor it is on at any given time, by tracking its beginning location and the change in floors it has made throughout its journey. The robot establishes a Wi-Fi link to a control box inside a car in each elevator bank, designated for use by Tugs or Homers so they can summon the car and ride it to a desired floor.

A Tug might be called upon to pick up a specimen on a particular floor, in a specified patient room. After it arrives, a nurse presses a red stop button on the robot and places the specimen inside its carrier, then pushes a green button, instructing the Tug to deliver the sample to the lab.

In addition, a Homer or Tug retrofitted with an RFID reader can be dispatched to a given floor or unit to collect tag data, enabling the Aethon software to generate an inventory of the area. Seiff says Aethon's asset-location software, running on the automaton's computer, determines the location of each tag sensed by its onboard RFID interrogator. It accomplishes this task using a proprietary algorithm to calculate the time it takes for a tag's RF signal traveling to reach the reader's antenna, while ascertaining the interrogator's location based on the robot's internal mapping function. The software pulls the signal data from the reader when the machine is at least three different distances from the tag. "The software might take one reading at 20 feet away," he explains, "then another 10 feet away and one 2 feet from the tag." Seiff says the software can determine the tag's location to an accuracy of approximately 3 feet.

A Homer or retrofitted Tug stores the location data of all the tags it reads throughout its "shift," then uploads this information to the main Tug OS software, running on a dedicated server at the hospital. This software is also used to send delivery commands to the robot, or to update its set route around the hospital. If the hospital has a Wi-Fi network, however, the robot sends the location data in real time to this server—or, if the facility has only partial Wi-Fi coverage, then it transmits its tag data as soon as it's within Wi-Fi range.

Although Aethon does not have an exclusive relationship with any single RFID hardware provider, Seiff says, all hospitals evaluating the RFID asset-tracking component of the Tug and Homer offerings are employing active UHF tags and readers manufactured by [Identec Solutions](#). Seiff notes that Aethon customers can choose to retrofit their Tugs already in use with RFID interrogators and antennas, or to purchase the Homer robots, then pay a monthly fee for each tag used. Thus, they don't need to pay the full price of each tag in addition to the licensing cost of the Aethon location software.

RELATED_ARTICLES For example, if a hospital decides to track 100 assets, they might pay \$500 per month (\$5 per tag) to have all tagged assets tracked. Maintenance of the tags and software, as well as the license to use the software, would be included in this price.

"We're getting a lot of interest from hospitals that are already using RFID to track assets in their operating or emergency rooms, but don't want to pay to install a reader infrastructure throughout their entire hospitals," says Seiff. "By using Homer or adding readers to their Tugs, they don't need to worry about shutting down rooms in order to install readers. And if they change the location of departments within the hospital down the line, they won't have to also move the reader infrastructure."

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